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IS 10854-1 (1984): Cutter Suction Dredge Components, Part 1: Cutter [TED 18: Inland, Harbour Crafts and Fishing Vessels]

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“Knowledge is such a treasure which cannot be stolen”



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Indian Standard

SPECIFICATION FOR CUTTER SUCTION DREDGE COMPONENTS

PART 1 CUTTER

1. Scope — Covers the types and other requirements of the cutter used as a dredge component for cutter suction dredgers.

2. Definitions

2.1 Cone Angle — The angle formed by the profile of the cutter — this angle is approximately twice the angle between the bottom of the cut and the centre line of the inclined ladder.

2.2 Face Angle — One half the cone angle.

2.3 Sweep — The angular displacement of the cutter blades — the included angle along the periphery of the cutter of one complete blade. A three blade cutter has a sweep angle of 120 degrees.

2.4 Rake Angle — The angle made by the tangent to the cutter's peripheral motion at the point of contact with the material being cut and the slope of the line of the blade or tooth face (see Fig. 1).

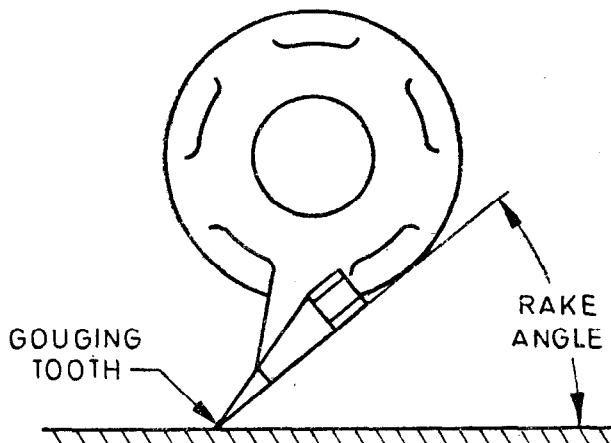


FIG. 1 CUTTER RAKE ANGLE

3. Types

3.1 The cutter shall be of the following types:

- Basket Type* — Having a front hub, a back wearing ring and several spiral shaped blades integral with the hub and ring and suitable for operation in soft material.
- Straight Arm Type* — Having blades extended beyond the hub and attached with bolts to a spider and suitable for operation in hard clay.

4. Requirements

4.1 Design — The cone angle, the face angle and its sweep and the rake angle form the physical factors to determine the cutter configuration.

4.1.1 The cutter's sweep angle shall be chosen to optimise the vibration encountered and the materials to be dredged.

4.1.2 The rake angle is the most important characteristic of the cutter and important to its operation. The angle best suited for obtaining maximum force shall be the angle which allows penetration of the material at the lowest torque.

4.2 Rating — The power applied to the cutter varies with the job and size of the dredge. The rating shall vary from 300 kW to 3 000 kW. The speed at which the cutter is turned shall vary between 10 to 30 rpm.

4.3 Material — The cutter shall be made of wear resistant steel. The leading edge of the cutter blade shall have a hardness of at least 500 Brinell and a yield strength of around 140 kN/cm². Steels of following designation are recommended for this purpose (see IS : 1570 - 1961 ' Schedules for wrought steels for general engineering purposes ').

40Ni2Cr1Mo28

31Ni3Cr65Mo55

40Ni3Cr65Mo55

4.4 Construction — The cutters shall be assembled in sections by casting each part separately and then suitably fitting them together.